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January 27, 1992

Federal Communications Commission  
Office of the Secretary

Donna R. Searcy  
Secretary  
Federal Communications Commission  
Washington, DC 20554

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FEDERAL COMMUNICATIONS COMMISSION

James H. Clingham  
Vice President  
Corporate Affairs

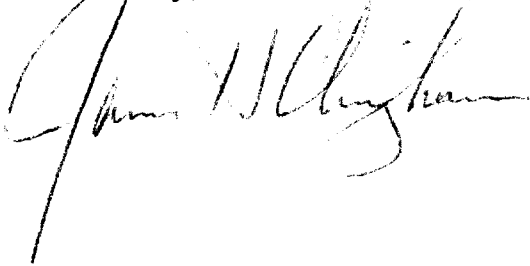
Re: **Reply Comments To:**  
**MM Docket No. 87-268**  
**Notice Of Proposed Rulemaking**  
**Advanced Television Systems And Their Impact Upon**  
**The Existing Television Broadcast Service**

Dear Ms. Searcy,

Enclosed are the original and nine (9) copies of the Reply Comments in the above referenced Notice submitted by the David Sarnoff Research Center.

Please direct all inquiries and communications relating to these Reply Comments to my attention.

Yours truly,



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Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

Federal Communications Commission  
Office of the Secretary

In the Matter of

Advanced Television Systems  
and Their Impact upon the  
Existing Television Broadcast  
Service

MM Docket No. 87-268

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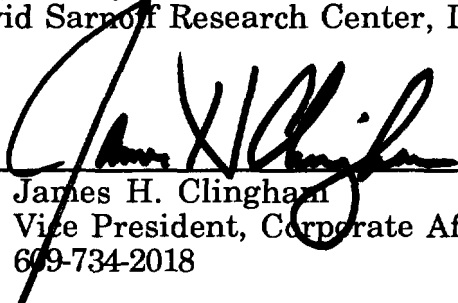
JAN 29 1992

Reply Comments  
of the  
David Sarnoff Research Center, Inc.

FCC MAIL ROOM

Respectfully submitted,  
David Sarnoff Research Center, Inc.

By:

  
James H. Clingham  
Vice President, Corporate Affairs  
609-734-2018

The David Sarnoff Research Center, Inc. (Sarnoff) is pleased to submit these reply comments in response to the many comments to the Notice of Proposed Rule Making (MM Docket Number 87-268). The Advanced Television Research Consortium, of which Sarnoff is a member, is the proponent for Advanced Digital Television (ADTV), which is scheduled for testing in Spring 1992. Sarnoff was the developer of the NTSC standard for color television and of black and white television.

Many comments emphasized the importance of interoperability and extensibility among different media. In particular, North American Phillips, General Instrument, Digital Equipment, and Apple, among many, have called for the implementation of a system that is both interoperable and extensible among varying formats used by different sources of video and audio information.

Sarnoff strongly agrees that any acceptable system must be interoperable and extensible. We believe that our ADTV digital system provides these features today while addressing the issues of cost and implementation in an NTSC environment. This is more fully described in the attached Executive Summary of the ADTV System Description dated January 20, 1992.

We believe that an acceptable system must include a standard compression technology which provides for a combination of multiple video formats, data formats for networks, and receivers that disregard unrecognized service types. Such a system will provide interoperability among different types of delivery media, as well as among a wide variety of consumer electronics, telecommunications, and computing equipment. The use of standard video and audio compression would also provide the possibility of interoperability with computer multimedia applications directly.

We believe that an acceptable system must exhibit open-ended extensibility; the capability to introduce new services without affecting older receivers. A digital format must be adopted which will eliminate future "backward-compatibility" problems in the installed base of receivers, removing a crucial constraint from the introduction of new services. Such a format will have capabilities that will pave the way for delivering many new features or services using such a standard, ranging from compatible HDTV stereo television, to new interactive entertainment forms, to compatible ultra-high definition television. The comment of the National Cable Television Association that the ATV process has shown that the technology is rapidly changing and improving and that any standard must be able to be augmented and improved is particularly important. The correct course is to ensure that the standard is extensible enough that it will not continue to cause compatibility issues in the future.

North American Phillips, the EIA and the ATSC, among others, all urged caution on the issue of the elimination of NTSC. Sarnoff agrees. We believe that planning for the implementation of an ATV broadcast system should be advanced and that planning for the termination of the NTSC broadcast system should be deferred. However, during this period the needs of the NTSC broadcast system

should not be ignored or neglected. An acceptable ATV system must have the broadest possible coverage area and, at the same time, a coverage area favorable to NTSC, transmitting a reliable and robust signal under the impaired transmission conditions likely to exist. It must also have a high level of immunity to both noise and NTSC interference to ensure that it can simulcast close to existing NTSC stations, so that a high percentage of broadcasters can be accommodated with an ATV channel. We believe that in the future, when NTSC broadcasts are no longer required, transmitter power can be increased to achieve an even greater ATV broadcast coverage area.

While agreeing that interoperability and extensibility are important criteria for an ATV standard, General Instrument asked whether they were more important than the other criteria, in particular the cost and quality issues. We believe that both cost and quality are extremely important and should not be ignored simply because they are not emphasized in the Notice of Proposed Rule Making. They are important because they are key to consumer acceptance and purchase of ATV equipment. Interoperability, extensibility, cost and quality can be simultaneously achieved by the ADTV system.

We believe that an ATV standard which uses a single video compression standard for all consumer and computer delivery media eliminates the need for multiple decoder types and is the most cost effective solution for consumers. The largest factor in reducing cost is high production volume and associated commodity pricing of integrated circuits. Over the long term, a standards-based approach will result in the use of common (or at least similar) devices in both the consumer and computer industries. The resulting high-volume production and commonality will directly benefit the consumer and indirectly benefit broadcasters and alternate media.

We also believe that compression and a high data rate are necessary to achieve superior HDTV picture and sound quality. Any system must reliably deliver high-quality HDTV service to its entire coverage area under most transmission conditions, and deliver viewable pictures and sound to its entire coverage area even under severely impaired transmission conditions.

In summary, while the comments focussed on interoperability and extensibility, other issues such as cost, quality and the needs of the NTSC system should not be ignored. ADTV is the only proposed system which successfully addresses all of these issues.

# **ADVANCED DIGITAL TELEVISION**

## **SYSTEM DESCRIPTION**

**JANUARY 20, 1992**

**Advanced Digital Television has been created at:**

***David Sarnoff Research Center  
Princeton, N.J.***

***Philips Laboratories  
Briarcliff Manor, N.Y.***

**by the Advanced Television Research Consortium.**

## **ADTV EXECUTIVE SUMMARY**

Advanced Digital Television (ADTV) is the digital HDTV system developed by the Advanced Television Research Consortium. ADTV has several unique attributes that contribute to its superior performance, flexibility and cost characteristics:

- MPEG video and audio compression
- Separate video, audio and data packaging that allows a flexible mix of services
- A data format that is well-suited for data networks
- Receivers that disregard unrecognized service types
- Two separate data carriers with different power levels
- A spectrally-shaped signal that *avoids* NTSC interference
- A high 24 Mbps total data rate

These unique attributes combine in powerful ways to give ADTV important advantages in the many important dimensions in which an HDTV system must be evaluated:

### **SUPERIOR HDTV PICTURE AND SOUND QUALITY**

ADTV combines MPEG compression, a standard that is the consensus of the world's leading compression experts, and a high 24 Mbps data rate to achieve superior HDTV picture and sound quality.

### **MOST RELIABLE AND ROBUST PERFORMANCE CHARACTERISTICS FOR BROADCASTING**

ADTV transmits its sound and "viewable picture" data on a separate higher-power carrier, providing reliability and robustness against severely impaired transmission conditions that could temporarily disrupt reception of the additional data required for full HDTV quality pictures.

### **LOWEST INTERFERENCE WITH EXISTING NTSC SERVICE**

ADTV's unique spectrally-shaped signal uses the simple and effective approach of *avoiding* the high-power portions of an NTSC signal to simultaneously achieve low interference with existing NTSC service and high immunity to NTSC interference.

### **COVERAGE AREA EQUAL TO NTSC WITH A HIGH ACCOMMODATION PERCENTAGE**

The higher-power carrier in ADTV's unique spectrally-shaped signal is attenuated by NTSC receivers, allowing acceptable levels of NTSC interference with the increased simulcast transmission power and reduced co-channel spacing needed to simultaneously provide outstanding coverage area and a high accommodation percentage.

#### **MOST FLEXIBLE SCOPE OF SERVICES**

ADTV's Prioritized Data Transport format separately packages video, audio and auxiliary data and allows their mix to vary dynamically, giving video service providers the flexible scope of services needed to innovate new services and new kinds of programming.

#### **GREATER INTEROPERABILITY AND EXTENSIBILITY FOR FUTURE GROWTH**

ADTV's layered architecture and its combination of multiple video formats, data formats that are well-suited for data networks, and receivers that disregard unrecognized service types provides interoperability and extensibility among different types of delivery media, as well as among a wide variety of consumer electronics, telecommunications, and computing equipment.

#### **LOWER COST FOR BROADCASTERS, ALTERNATIVE MEDIA AND CONSUMERS**

ADTV leverages the ISO-MPEG standard to achieve the most powerful economy of all — a single video compression standard for all consumer and computer delivery media, which will eliminate the need for multiple decoder types and create important synergies and economies of scale.

#### **CONCLUSIONS**

- ADTV has the outstanding HDTV picture and sound quality, transmission reliability and robustness, low-interference characteristics, and large coverage area required to be an effective HDTV simulcast system.
- ADTV has flexible operating characteristics that allow it to provide a broad scope of services, as well as the interoperability and extensibility needed to form the basis for new and innovative applications of HDTV in many industries.
- ADTV ensures low cost by its approach of building upon widely accepted standards.

ADTV will serve the public by providing high quality HDTV service at low cost, by enabling innovative new programming that will be delivered by broadcasters and other service providers, and by creating opportunities for innovative new consumer electronics and computer products. These attributes make Advanced Digital Television the best choice for an American HDTV simulcast standard.